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Service Manual

ORDER NO.
CRT3655

DVD MECHANISM MODULE(MS4)

CX-3183

This service manual describes the operation of the DVD mechanism modules incorporated in the models listed below.
When performing repairs use this manual together with the specific manual for the model under repair.

Model No.	Service Manual	DVD Mechanism Module
AVH-P7800DVD/UC	CRT3681	CXK6500
AVH-P7800DVD/RE	CRT3682	CXK6500

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PIONEER CORPORATION 4-1, Meguro 1-chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, CA 90801-1760, U.S.A.
PIONEER EUROPE NV Haven 1087, Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE. LTD. 253 Alexandra Road, #04-01, Singapore 159936

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K-ZZU. MAY 2006 printed in Japan

1. CIRCUIT DESCRIPTIONS(FE PART)

1 Front End Part (MN2DS09AAUB:IC1501)

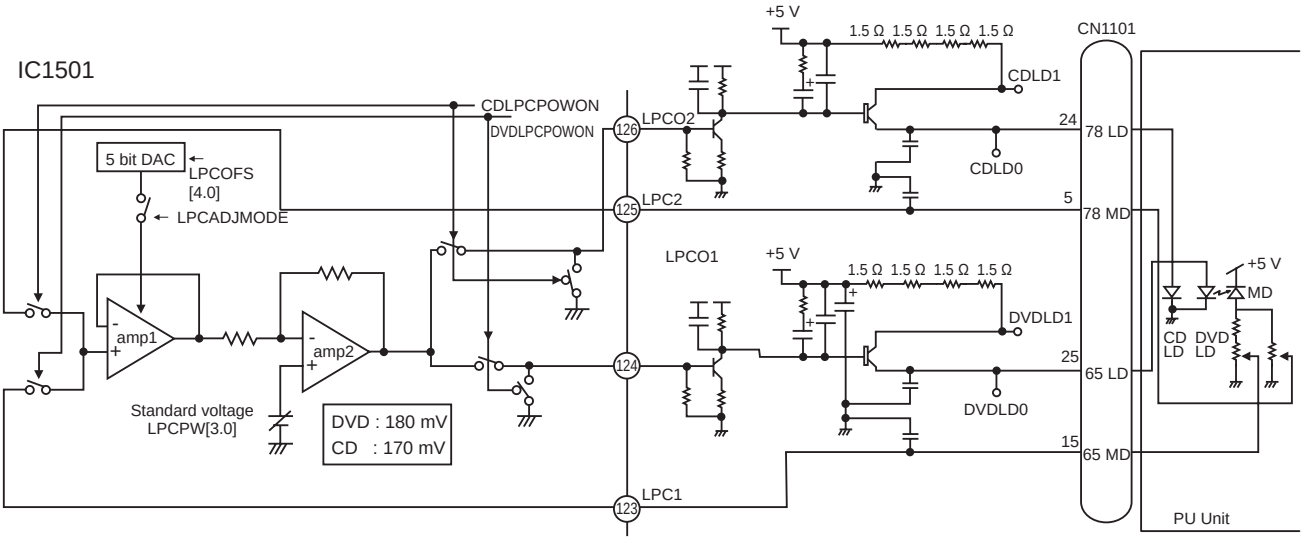
MN2DS09AAUB are 1-chip LSI for DVD-Player. The connection of this LSI to the Driver IC, SDRAM, Flash-ROM, Audio-DAC, etc. can configure the DVD-Player System.
This LSI contains Front End (SODC/FE) that performs RF signal /Servo /Decode processings, Back End (AV decoder/BE) that performs the video decode processing such as MPEG1/MPEG2/JPEG and audio decode processing such as DVD-Audio/Dolby Dijital/DTS/MP3, and the system controller (Siscon) for controlling the system.
Front End part realizes the arithmetic processing of optical head signal and RF signal processing, the digital signal processing for DVD-ROM reproduction that conforms to DVD standards (16-8 Demodulation, Error correction), the digital signal processing for CD-DA/CD-ROM (Error correction), AV decoder transmission, servo control, spindle motor control and seek control.
Please take note that, The waveform of servo system on the front end, FE, TE and AS is not seen in MN2DS09AAUB,like the DVD mecha-module (MS3V1) of CX-3078.

1.1 Analog Block (MN2DS09AAUB:IC1501)

An analog block becomes the following functions.
1.Standard power supply circuit
2.The servo system/ The DPD signal processing system circuit
Gain change amplifier an Low pass filter(LPF)
3.RF signal processing system circuit
RF addition circuit , Inline circuit and Variable Gain Amplifire(VGA) circuit
4.Laser power control (LPC) circuit
5.The A/D converter for servo (10bit, 5bit-4ch) , PWM

1.1.1 APC Circuit

The optical output for the laser diode (LD) has large minus temperature characteristics. Therefore, the constant optical output cannot be obtained when LD is driven by the constant current. APC circuit controls the electric current so as to provide constant output at the monitor diode (MD). MN2DS09AAUB contain two types of APC circuits, one for DVD and another for CD. The LD electric current for DVD (CD) can be obtained by dividing the voltage measurements between DVDLD1 (CDLD1) and 5V by 6 Ω (1.5 Ω x 4=6 Ω). For DVD (CD), the results are approx. 50 mA (45 mA).
The potential difference between DVDLD1(CDLD1) and 5 V is set to approx. 300 mV (270 mV).

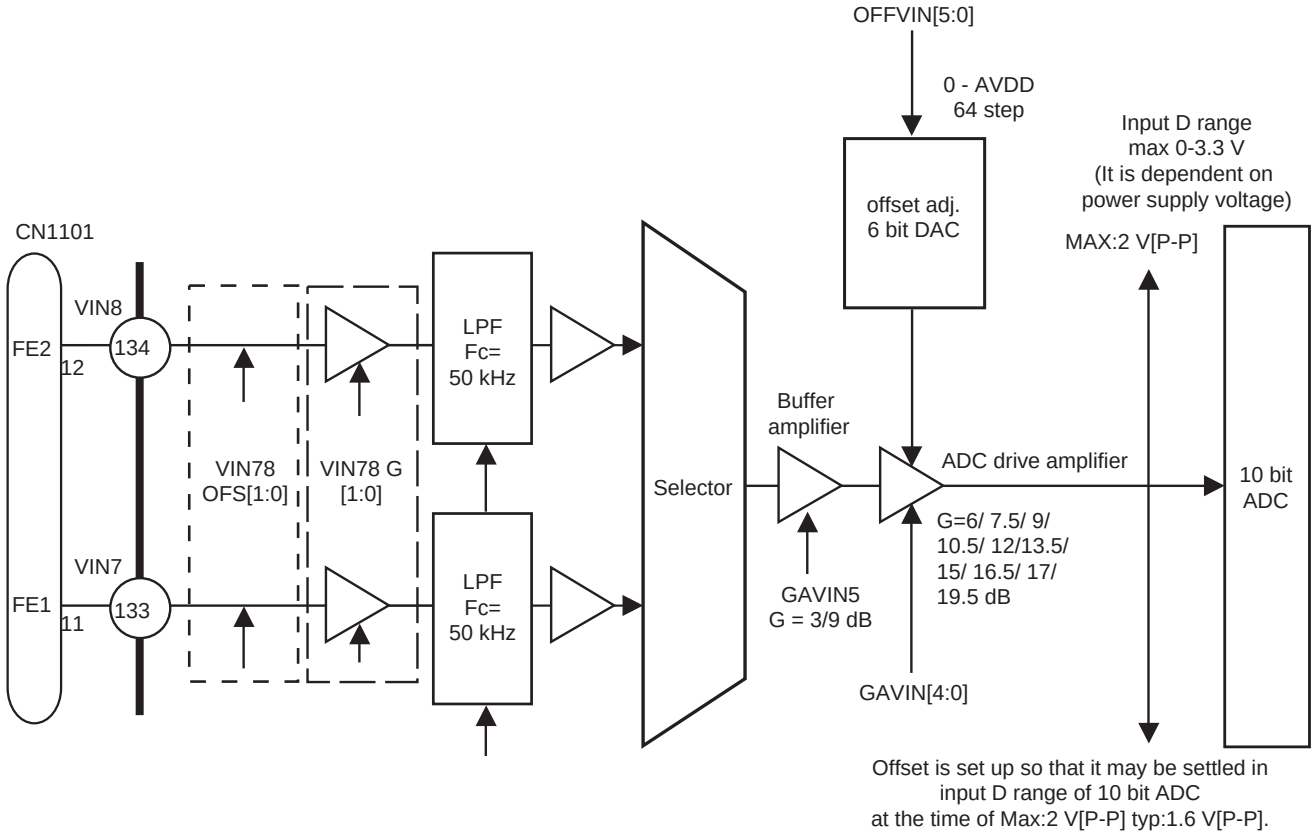


1.1.2 FE Generation Circuit

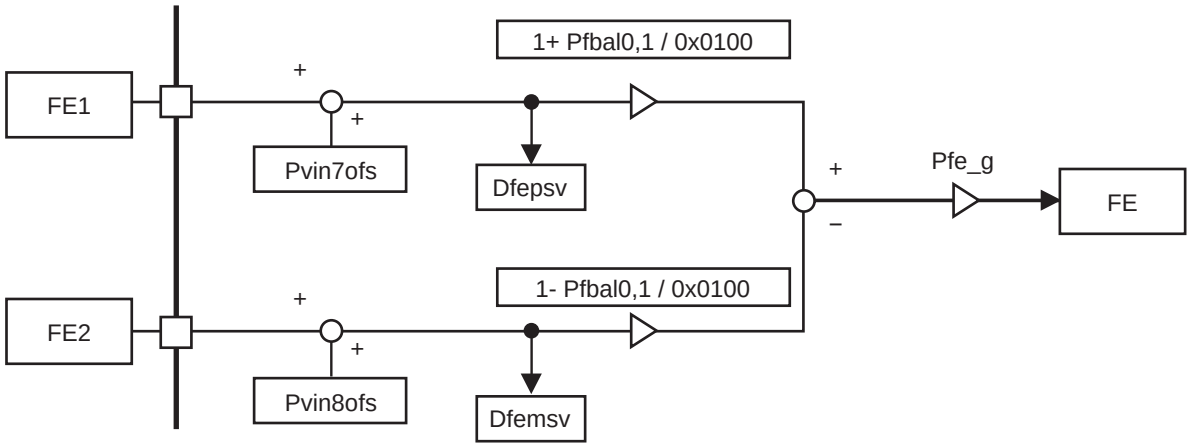
Focus Error (FE) Generation Circuit

In IC1501 inside, the AD translation of the signals RF1 and RF2 from PU is carried out, and they are taken in. Then, offset cancellation is considered, differential is taken and it is set to FE.

FE = (FE1) - (FE2)



After 10bit ADC



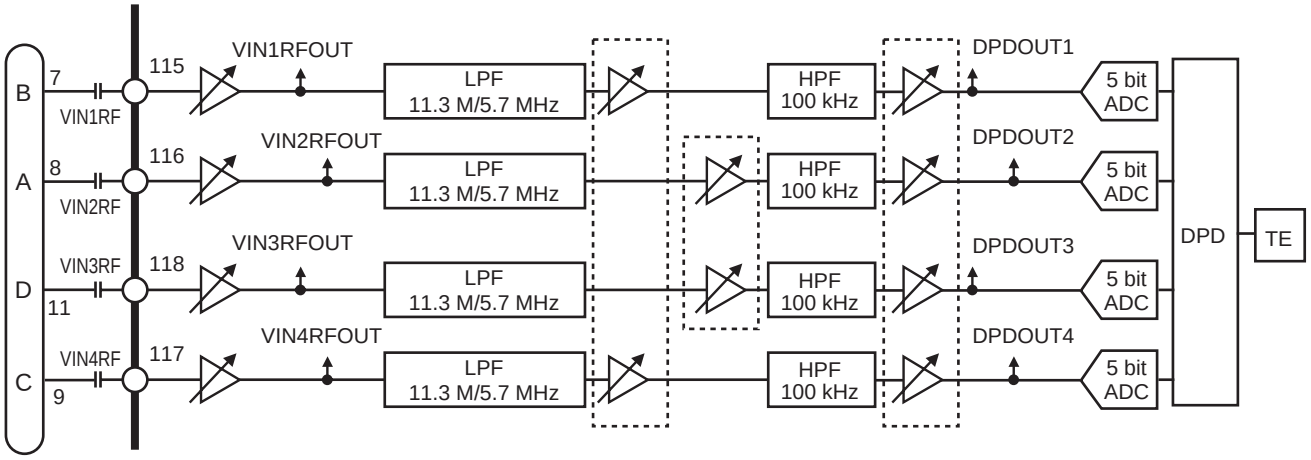
1.1.3 TE Generation Circuit

Trackings Error (TE) Generation Circuit

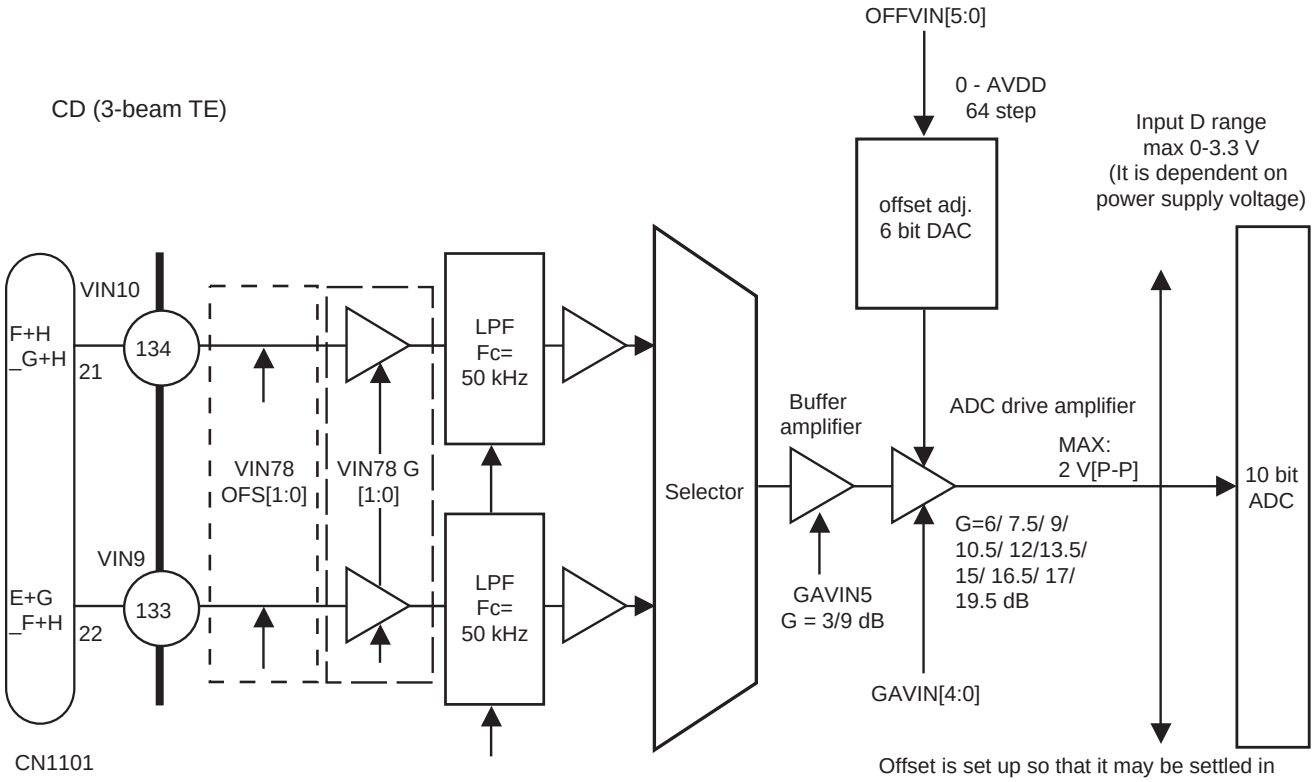
For DVD, TE is generated, with the application of a phase contrast method, from the phase difference of (B2+B4) and (B1+B3). For CD, TE is generated, with the application of a 3-beam method, by sending the signal to the variable amp set for the tracking offset adjustment via outer-attached resistance and then by AD-converting it to make the formula of TE=A−C.

DVD (TE from phase difference)

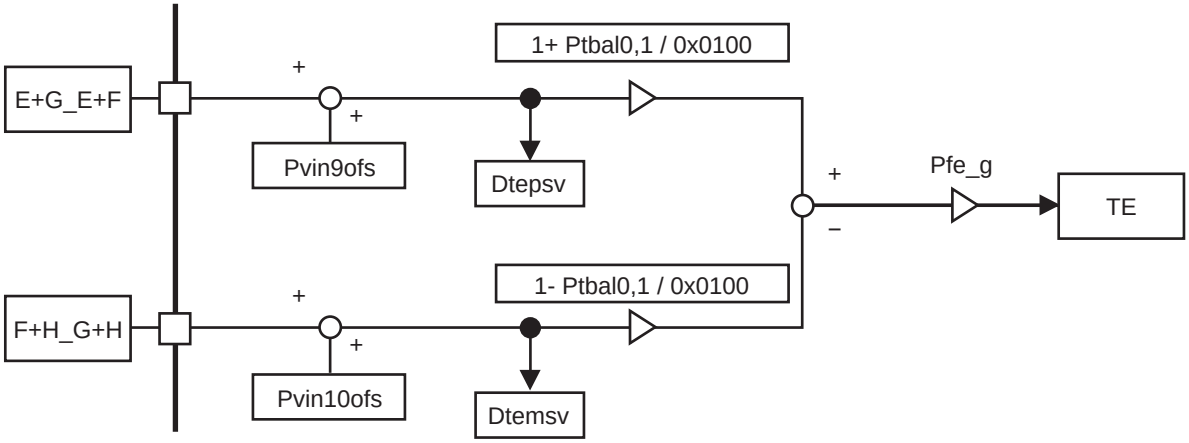
CN1101



CD (3-beam TE)



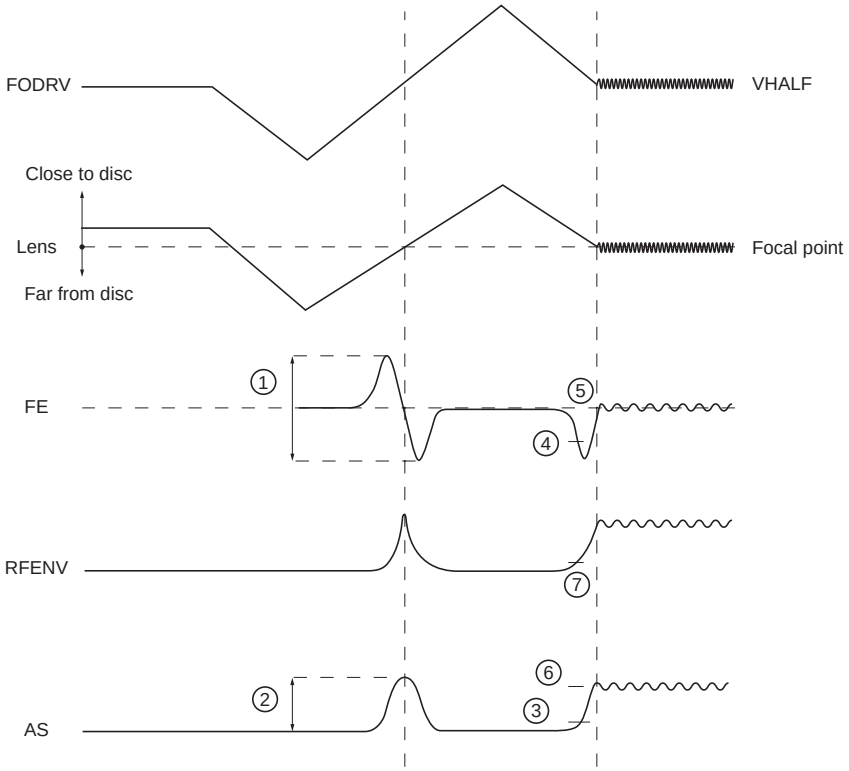
After 10bit ADC



1.2 Servo Block (MN2DS09AAUB:IC1501)

Servo block performs focus, tracking, servo control for traverse, spindle motor control and seek control.

1.2.1 Focus Close



After issuing the focus close command, the following processes are taken for both DVD and CD.

1. Measure and optimize signal levels
   First drive PU lens far from the disc and then drive closer to the disc. At the focal point met in the process of this move, measure signal levels of FE, AS and RFENV respectively, and optimize their levels for FE and AS (1 & 2 in the above figure).
2. Focus closing
   Next, drive the lens far from the disc again to detect the closing levels of FE and AS.
   Then activate focus loop filter for closing focus (3 6).
3. Check closing
   Check the closing with signal levels of AS and RFENV (6 & 7).

Focus search in test mode can check the signal levels and focus drive voltages for FE, AS and RFEV.

1.2.2 Tracking Close

After issuing the tracking close command, the following processes are taken for both DVD and CD

1. Tracking brake
   Measure one half cycle of the tracking cross and if the cycle is within the range of designation, output the brake pals.
   Output direction of brake pals is determined by the phase relations of OFTR and TKC (TE's binarization) signals.
   After confirming that the swing of lens against disc is controlled, the brake stops and the closing begins. If the closing condition is not met within 10msec. after outputting brake, the brake stops and the closing begins.
2. Tracking closing
   Process the tracking drive hold with OFTR signal.
3. Check closing
   Check whether or not the track jump does not exceed the designated number within the designated term.
   Closing check will be time-out at 20msec. Retry using a command from the microcomputer.

1.2.3 Track Jump

The system selects from three types of methods; i.e. interval jump, multi jump and traverse seek, according to the target number of moving tracks.

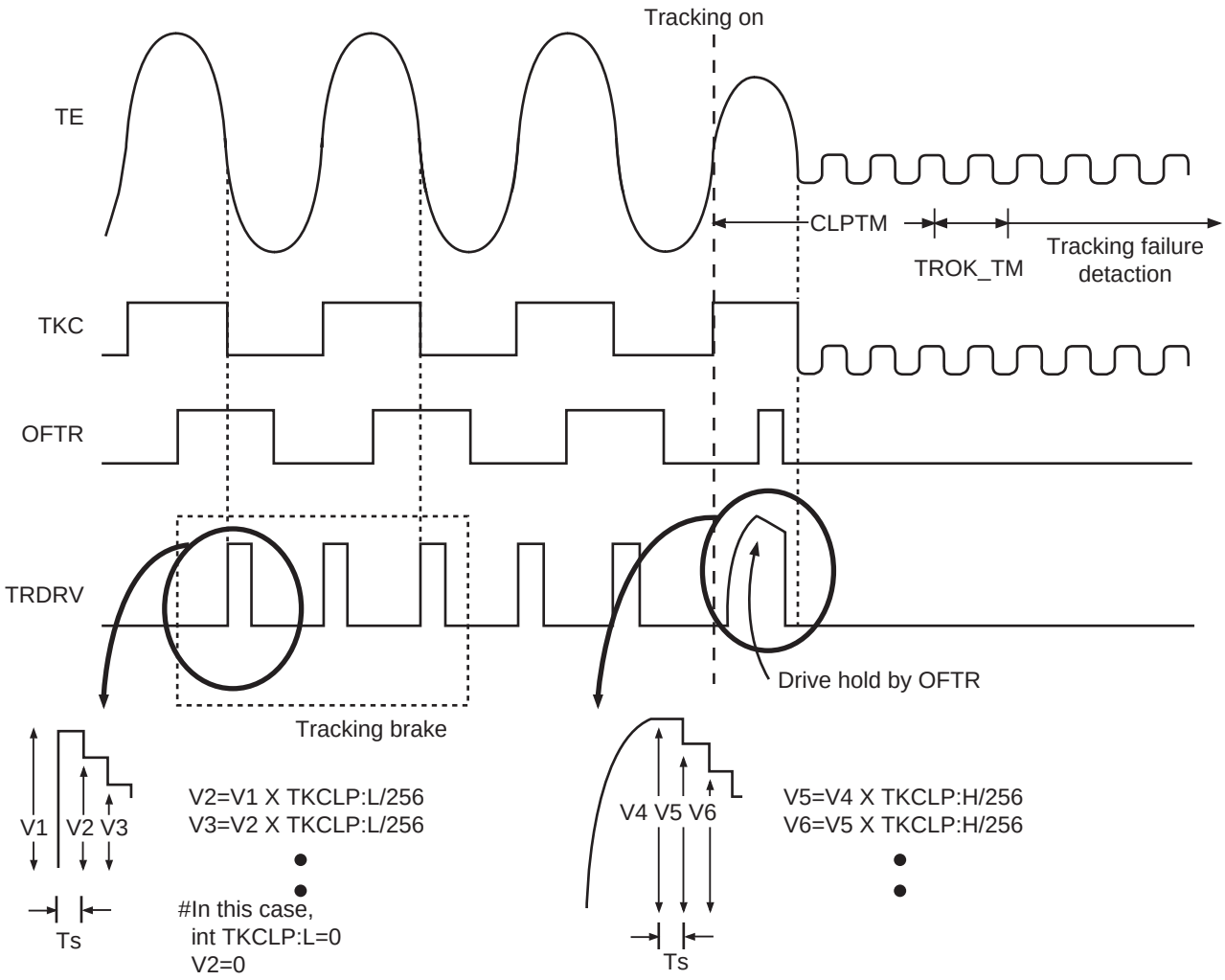
1. Interval Jump
   The detailed seek is capable due to the execution of repetitive one-track jumps.
   It is used when approaching to the target track or seek-operating to an adjacent track.
2. Multi Jump
   It counts both edges of the track cross signal TKC and moves for designated number of track counts.
3. Traverse Seek
   It controls the movement speed by measuring the time of the track cross signal TKC and manages the vibration of pickup generated upon movement to the minimum.

Types of target number of moving jumps illustrating the jump switch setting for both DVD and CD

DVD	CD
1-10 Interval Jump	1-10 Interval Jump
11-100 Multi Jump	11-32 Multi Jump
101-500 Combination of Multi Jump and Interval Jump	33-500 Combination of Multi Jump and Interval Jump
Over 501 Traverse Seek	Over 501 Traverse Seek

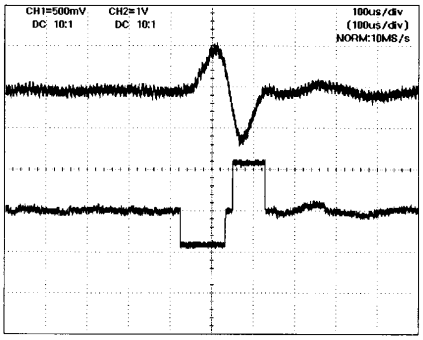
The waveforms of track jumps are shown in the next page.

Tracking-on process

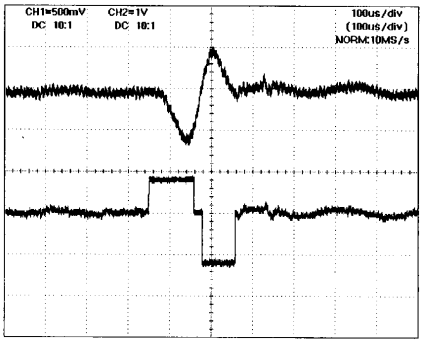


Interval Jump (1 Track)

Outer Jump

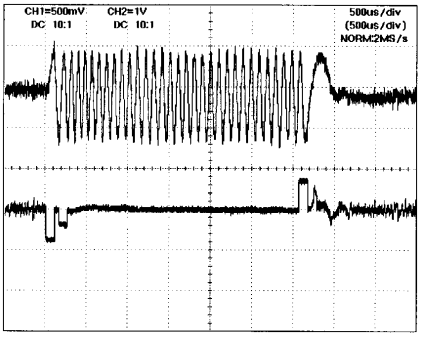


Inner Jump

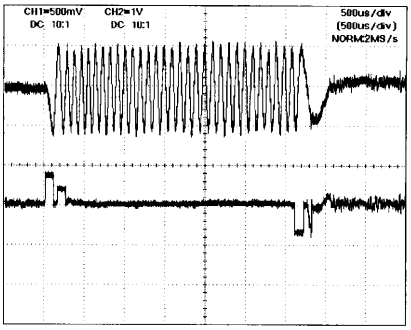


Multi Jump (32 Track)

Outer Jump

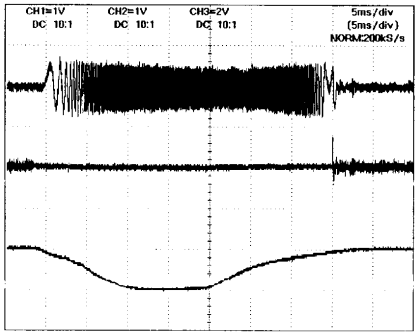


Inner Jump

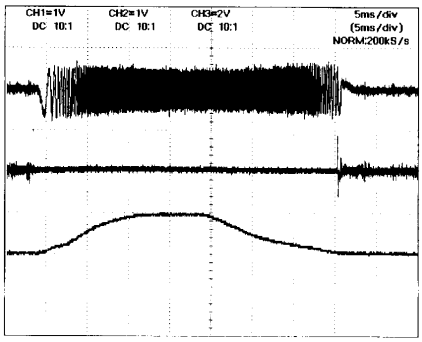


Traverse Seek (501 Track)

Outer Jump

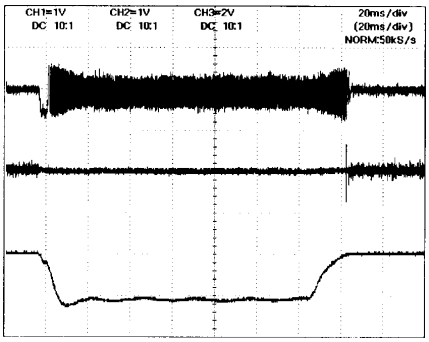


Inner Jump

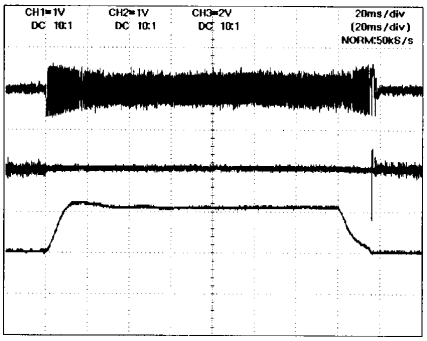


Traverse Seek (5000 Track)

Outer Jump

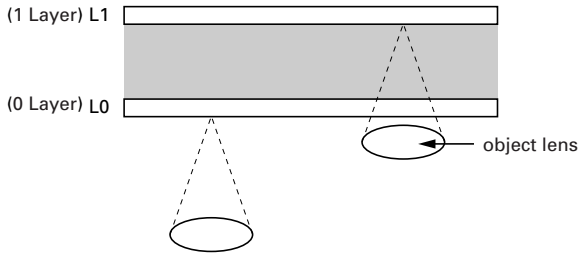


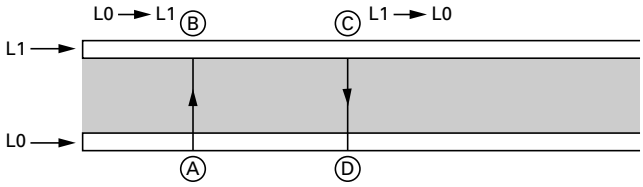
Inner Jump



1.2.4 Focus Jump

Focus jump is a function corresponding to the single-sided or both-sided two-layers.
Seen from the object lens, a forward layer is called 0 Layer (L0) and a farther one is called 1 Layer (L1).

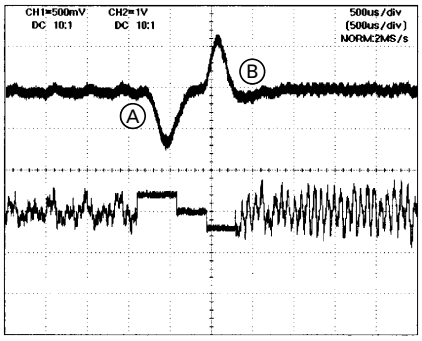




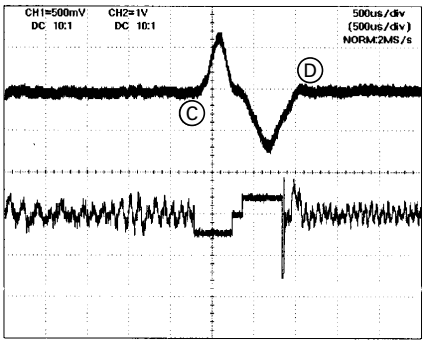
The waveforms of focus jump are shown below.

The waveforms of focus jump

L0→L1



L1→L0



The flow of focus jump is shown below
1. Open tracking at the layer during play.
2. Issue a command to execute jump to the target layer.
3. At the jumped layer, replay by closing the tracking.

Also, the processes when issuing a jump command are as follows
1. Accelerate the lens to the target layer until FE signal detects the acceleration completion level for focus jump. However, if the time of acceleration time-out reaches before detecting the acceleration completion level, the acceleration will compulsively stop.
2. Move lens with inertia instead of outputting the drive voltage until FE signal detects the deceleration initiation level.
3. Decelerate lens for the duration from detection of the deceleration initiation level to the deceleration completion level.
   However, if the time of deceleration time-out reaches before detecting the deceleration completion level, the deceleration will compulsively stop.

1.3 Automatic Adjustment Function

This system totally automates the circuit adjustments.
The details of automatic adjustments are explained respectively as follows:

1.3.1 VIN7,VIN8,VIN9 and VIN10 Offset Cancel

Each of analog signals for VIN7, VIN8, VIN9 and VIN10 generated at FEP is converted into a digital signal by A/D converter inside servo block. Offset cancel is a function to cancel the input offset of A/D converter when the power is on.

1.3.2 VCO Gain Adjustment (VARI Adjustment)

It has a function to absorb dispersion of VCO gains among LSI solid by learning and to automatically adjust VCO gains for the constant allocation. Lock VCO to standard frequency for study, read Frequency Control Value (FCNT), and then adjust VARI register so that the value becomes equivalent to the target FCNT value.

1.3.3 FE Normalization Adjustment

After A/D-converting FE signal level at servo block which was measured at focus close, adjust it to 190LSB at the digital equalizer input stage.

1.3.4 Tracking Balance (TBAL) Adjustment

By applying Newton-Raphson method, search for a balanced point at which DC offset becomes 0 by vibrating lens toward track direction at the time of the focus close and the tracking open.

1.3.5 Tracking Error Amplitude Learning

After vibrating lens toward track direction at the time of the focus close and the tracking open,

the Tracking Error amplitude level, adjust it to 190LSB at the digital equalizer input stage

1.3.6 Focus Balance (FBAL) Adjustment

Adjust the focus position so that RFENV becomes maximum at the tracking close.

1.3.7 Focus Gain Adjustment and Tracking Gain Adjustment

Insert disturbance to servo loop at the tracking close and adjust to a target gain intersection.

1.3.8 AS Normalization Adjustment

After measuring AS signal levels for the designated number of samplings at the tracking close, the precise adjustment is made to set 64LSB at the digital equalizer input stage.

All automatic adjustments can be confirmed by indicating their results at test mode.

List of Automatic Adjustment Coefficients

States	Coefficients	DVD	CD
Power On	VIN7 Offset	06B7 ～ 08CD	06E1 ～ 08A3
	VIN8 Offset	06B7 ～ 08CD	06E1 ～ 08A3
	VIN9 Offset	—	06B7 ～ 08CD
	VIN10 Offset	—	06B7 ～ 08CD
F Close	FE MAX	0E48 ～ 36CD	13A5 ～ 469A
	FE MIN	C933 ～ F1B8	B966 ～ EC5B
	AS MAX	0981 ～ 3384	0A23 ～ 3600
	FE Normalization	01BB ～ 06A7	0158 ～ 04D3
F Close (after TBAL)	TE MAX	1A90 ～ 4D58	0337 ～ 381A
	TE MIN	B2A8 ～ E570	C7E6 ～ FCC9
	TE Normalization	0145 ～ 02E9	01B1 ～ 1D85
T Close	F Gain	0100 ～ 0400	←
	T Gain	0100 ～ 0400	←
	AS Normalization	013E ～ 06BC	012F ～ 0650

Note: Coefficients are indicated in hexadecimal numbers.
All figures describe specifications at the production line.
Disc applies DVD−REF−A1 for DVD and TCD−782 for CD.

1.4 CIRC Block (MN2DS09AAUB:IC1501)

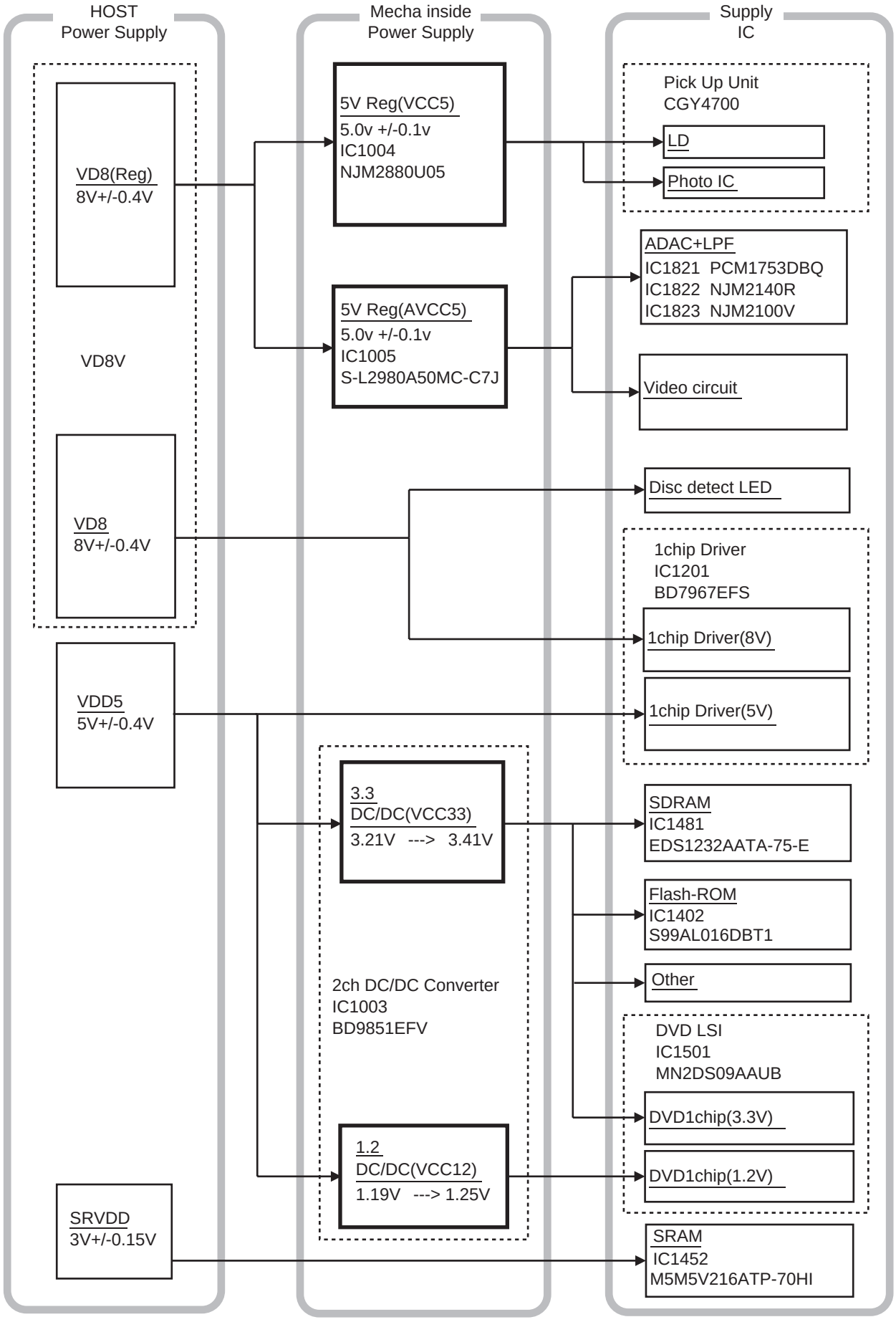
CIRC block contains digital signal processing function for CD−DA and CD−ROM (EFM demodulation and error correction), digital servo processing for spindle motor.

1.5 DRC Block (MN2DS09AAUB:IC1501)

Digital Read Channel (DRC) provides A/D converter, adaptive equalization, bit-a-bit detector, digital PLL circuit, Digital equalizer(DEQ),RISC interface and peripheral circuits for reading signals of optical disks.

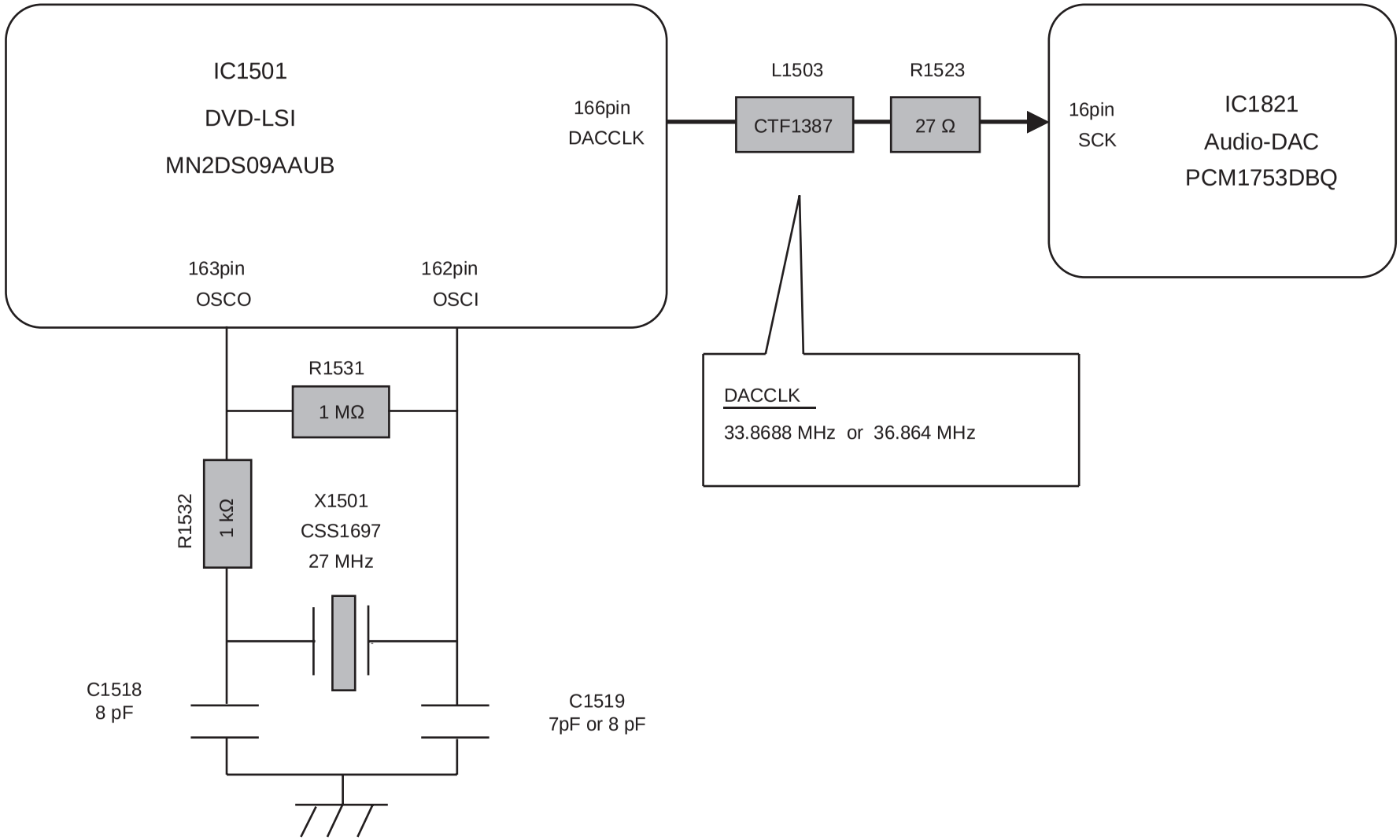
2. CIRCUIT DESCRIPTIONS(BE PART)

2.1 POWER SUPPLY MAP



2.2 Clock Circuit

[Outline]
Connecting 27MHz crystal resonator to the DVD-LSI (IC1501) will generate and provide DACCLK for the external connection of Audio-DAC at the clock generator inside DVD-LSI other than the clock used inside LSI.



2.3 Audio Circuit

[Outline]

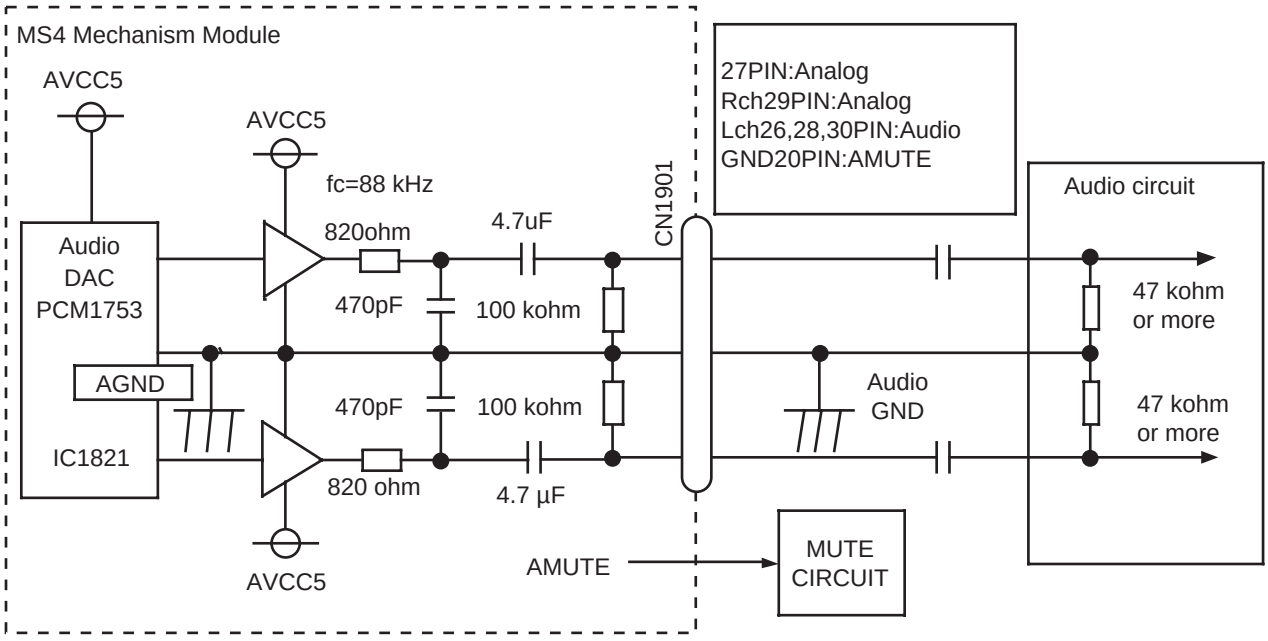
2.3.1 Analog Audio Signal
The serial 3-line digital output+DACCLK [digital serial audio data] that outputs from DVD-LSI (IC1501) is converted to the analog audio signal by Audio-DAC (IC1821) for an output from HOST IF (CN1901).
Also, the analog MUTE signal is simultaneously output from DVD-LSI (IC1501) via HOST IF (CN1901).

2.3.2 Digital Audio Signal (IEC60958/IEC61937)
The digital audio signal (IEC60958/IEC61937) that outputs from DVD-LSI (IC1501) is generated via Multi-ch/Ripping IF (CN1851).

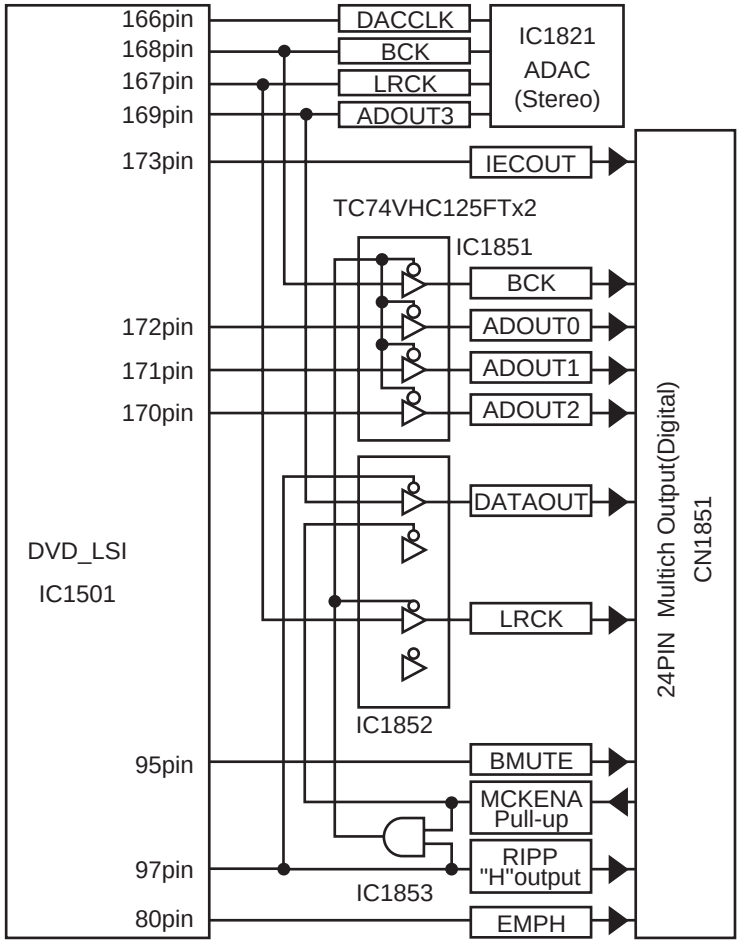
2.3.3 Digital Multi-channel Audio Serial Signal
The serial 6-line output that outputs from DVD-LSI (IC1501) is generated via Multi-ch/Ripping IF (CN1851).

2.3.4 CD-DA Ripping Signal
The serial 3-line digital output+SUB-CODE signal that outputs from DVD-LSI (IC1501) is generated at quadruple speed via Multi-ch/Ripping IF (CN1851).

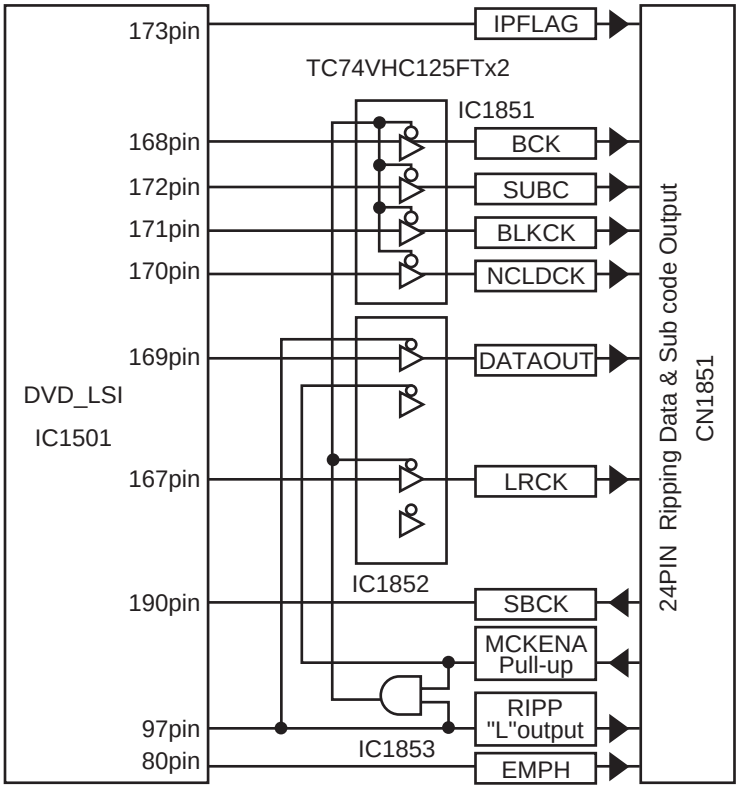
[Analog audio signal]



[Digital Audio Signal]

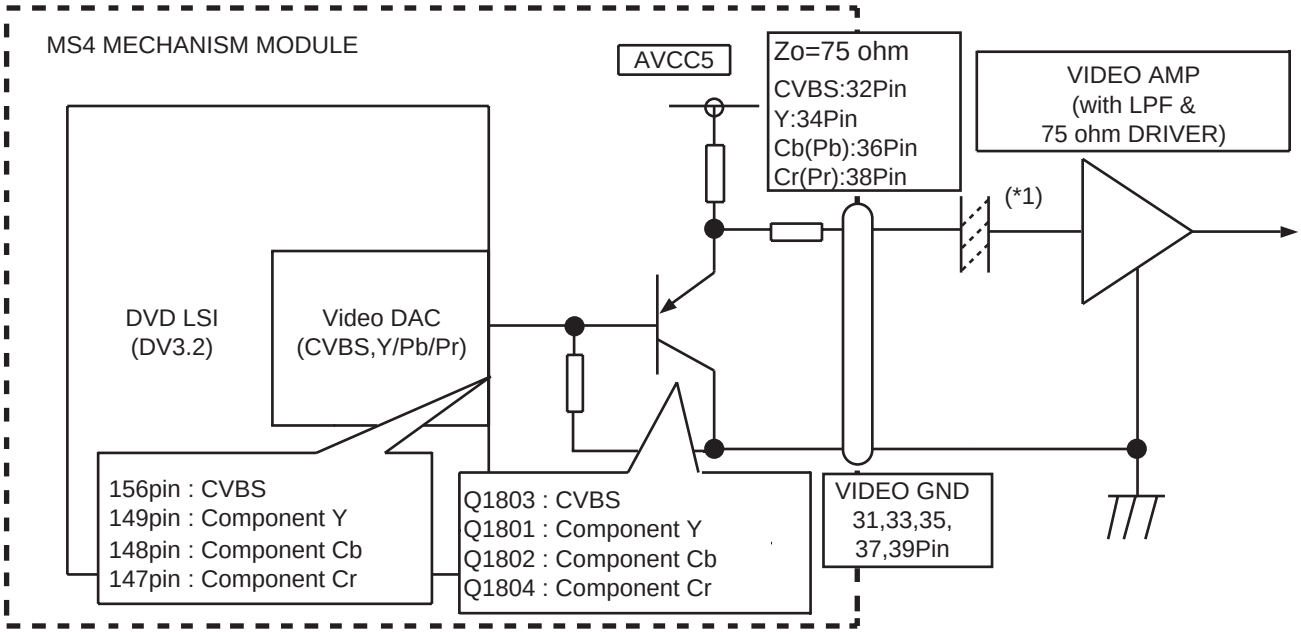


[CD-DA Ripping Signal]



Video Circuit

Composite Video Signal and Component Signal is output from DVD-LSI(IC1501) circuit part.
Output from HOST I/F(CN1901) via Buffer circuit.



2.4 SDRAM I/F

[Outline]

It is a memory to realize AV decoding function for DVD-LSI (IC1501). It is used for the buffering of stream data before decoding, the work domain upon decoding, the storage of AV data and output data after decoding and manyother purposes.

■ SDRAM Interface

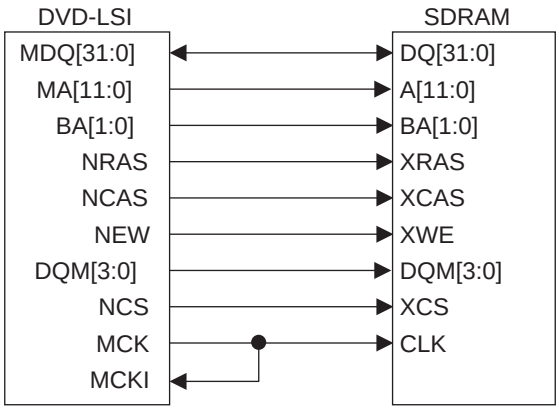
*Seen from ↓DVD-LSI

Signal Name	Bits	I/O	Description
MDQ[31:0]	32	I/O	Data bus for external SDRAM
MA[11:0]	12	O	SDRAM address
BA[1:0]	2	O	SDRAM bank address
NRAS	1	O	RAS signal in SDRAM
NCAS	1	O	CAS signal in SDRAM
NEW	1	O	Write enable signal in SDRAM
NCS	1	O	Chip select signal in SDRAM
DQM[0]	1	O	Mask signal writing lower byte among the lower 2 bytes in SDRAM
DQM[1]	1	O	Mask signal writing higher byte among the lower 2 bytes in SDRAM
DQM[2]	1	O	Mask signal writing lower byte among the higher 2 bytes in SDRAM
DQM[3]	1	O	Mask signal writing higher byte among the higher 2 bytes in SDRAM
MCK	1	O	Clock input into SDRAM
MCKI	1	I	Clock input for data input from SDRAM

■ SDRAM Specifications

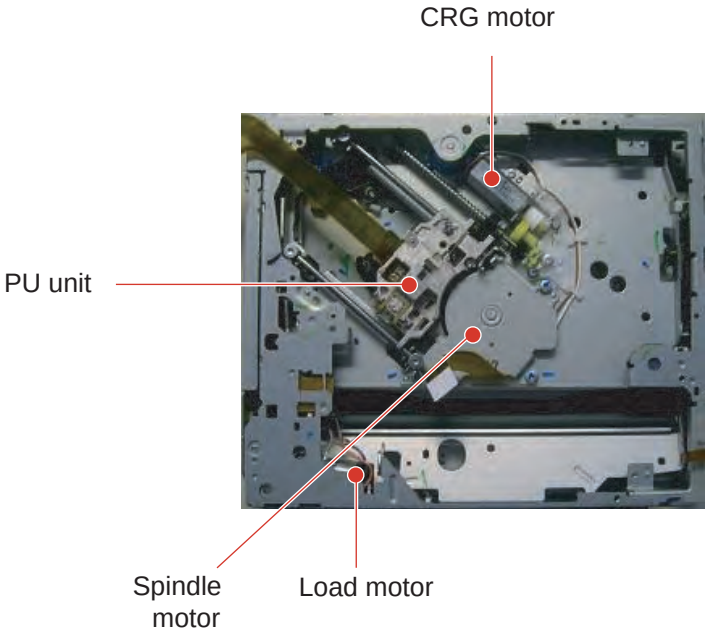
- Data bus width : 32bit
- Operating frequency : 121.5 MHz
- CAS latency = 3
- 8-word burst transfer
- CAS before RAS refresh (Auto refresh)

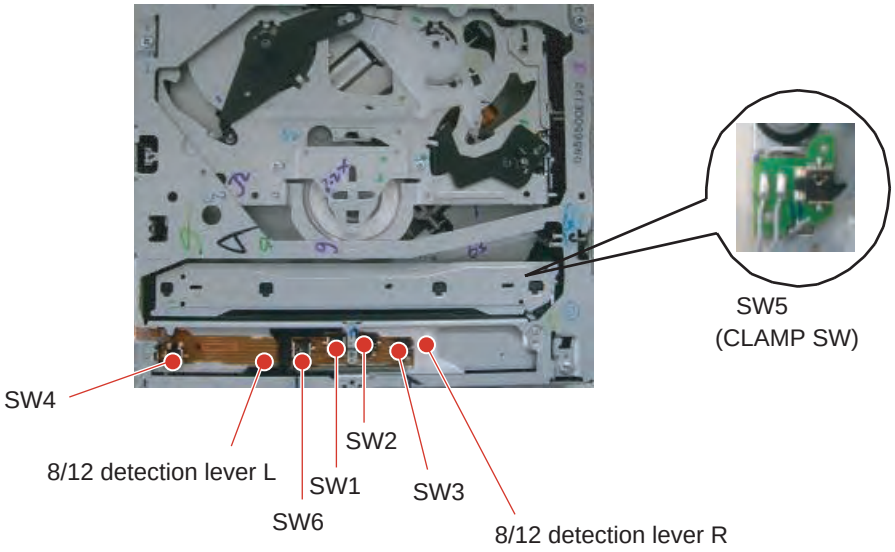
■ Configuration of SDRAM Connection



3. MECHANISM DESCRIPTIONS

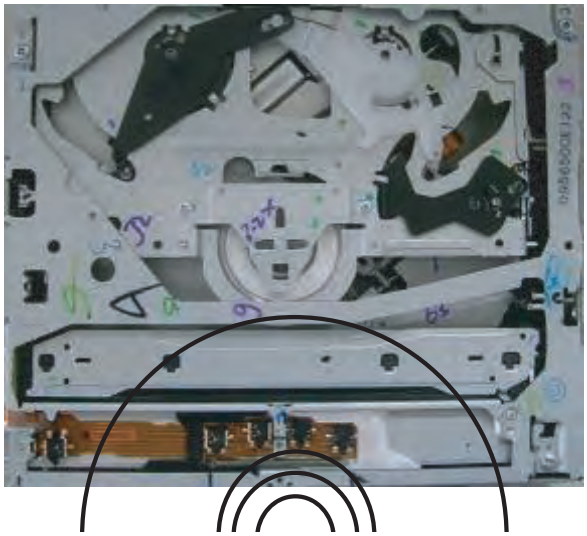
Configuration





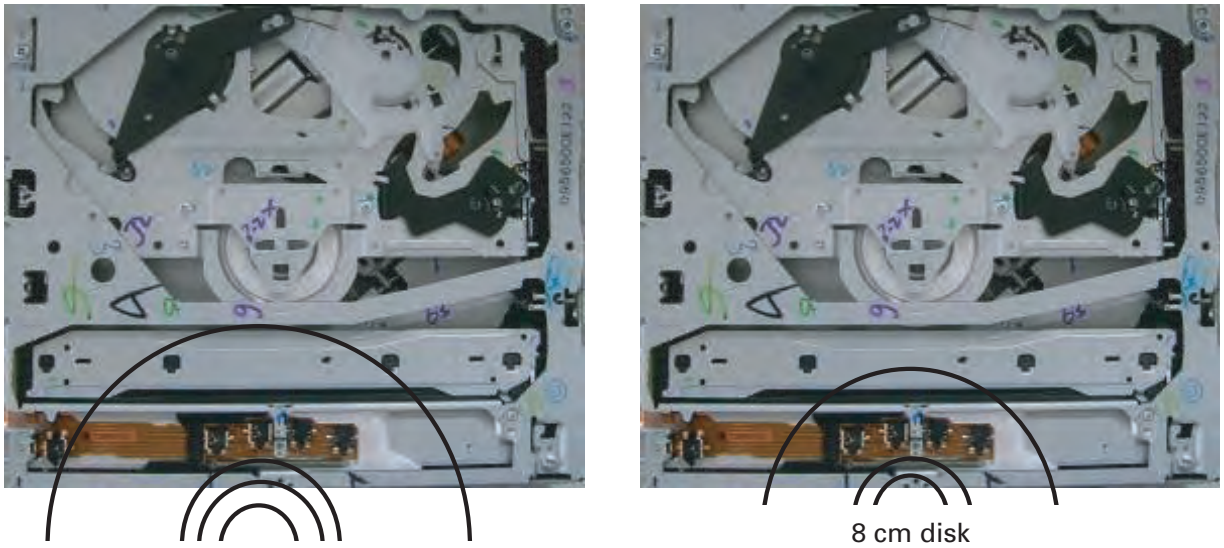
3.1 Disc loading operation

1. When a disc is inserted, the 8/12-detection levers R and L slide. Either of the switches SW1 and SW2 is shifted from ON to OFF, which triggers the operation of the loading motor.
2. For a 12cm disc, the switch SW3 is turned OFF and SW4 is ON during disc transportation. The microcomputer senses that a 12cm disc is loaded.



12 cm disk

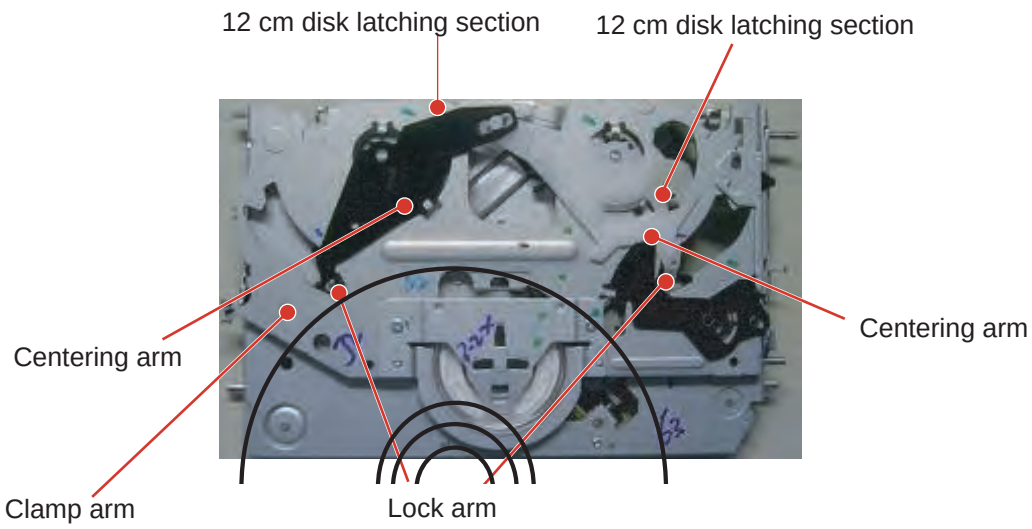
3. For an 8cm disc, neither the switch SW3 nor SW4 will be shifted to the above states (SW3: OFF, SW4:ON) during disc transportation. The operation mode proceeds to the clamp operation. The microcomputer senses that an 8cm disc is loaded.



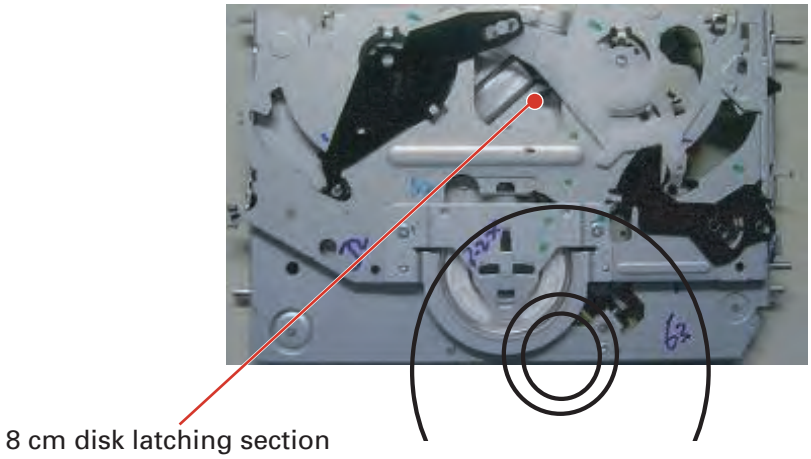
8 cm disk

3.2 Disc centering mechanism

1. With a 12cm disc loaded, the disc pushes both of the lock arms R and L to open the centering arms R and L. Then, the clamp arm or the stopper of the centering arm R stops the disc for centering. The operation mode proceeds to the clamp operation.

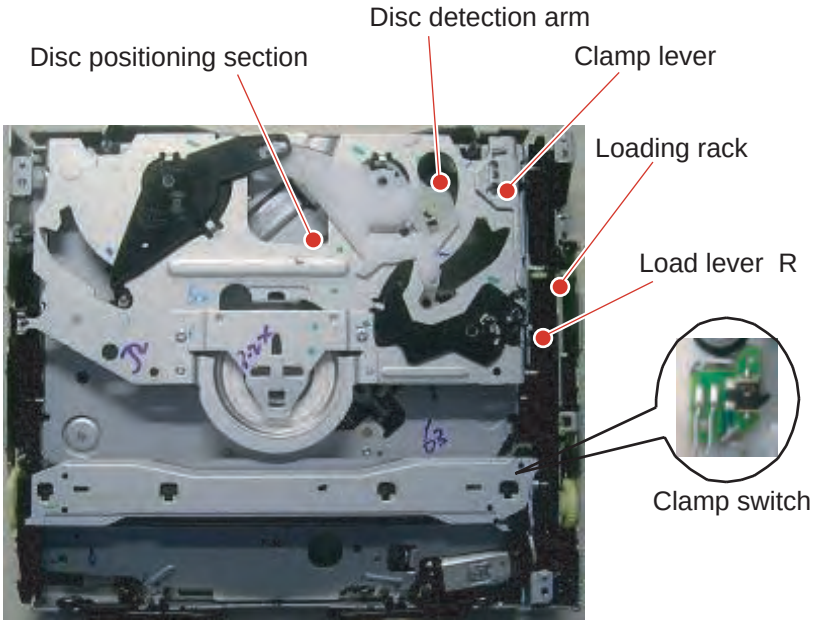


2. With an 8cm disc loaded, the disc pushes either of the lock arms R and L. The lock arms R and L are connected each other via the centering arms R and L. The lock arms R and L will be kept locked unless the disc pushes them at the same time. Therefore, the lock arm blocks the disc for centering. During disc centering, the disc pushes out the disc detection arm. When the detection arm completes moving, the disc stops. The operation mode proceeds to the clamp operation.

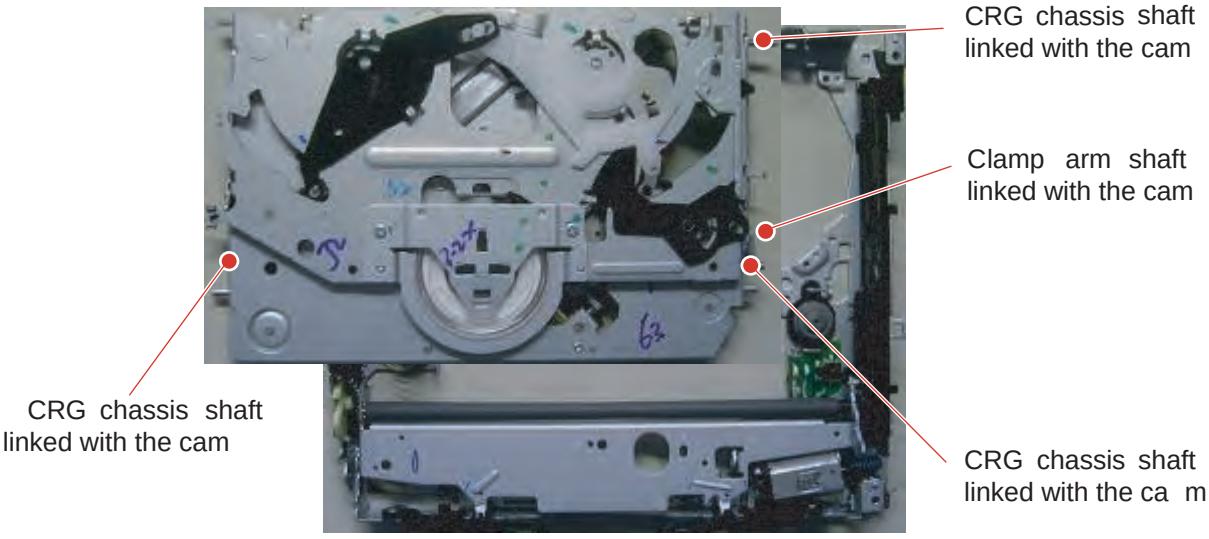


2.3 Clamp operation

1. When an 8 or 12 cm disc is centered over the spindle, the disc detection arm moves the clamp lever. The loading rack driven by the clamp lever is engaged with the lever driving gear , which triggers the disc clamp operation.



2. When pressed by the loading rack, the load lever R moves toward the front side, and the roller shaft, which is connected to the cam of the load lever R, moves downward. The roller shaft is connected to the cam of the cam ring also. Therefore, the drive of the roller shaft is transferred to the load lever L via the cam ring. The load lever L moves toward the front side. The load lever cams are released from the three shafts for the CRG chassis unit and the clamp arm shaft. When the load lever R turns on the clamp switch, the clamp operation ends.


CRG chassis shaft linked with the cam
Clamp arm shaft linked with the cam
CRG chassis shaft linked with the cam
CRG chassis shaft linked with the ca m

2.4 Eject operation

1. When the loading motor turns in reverse, the disc eject operation begins.
2. With a 12cm disc loaded, when the SW4 is shifted from OFF to ON, and then OFF again, the eject operation ends.
3. With an 8cm disc loaded, when the SW3 or SW6 is shifted from ON to OFF,and then both switches are turned ON, the eject operation ends.

4. DISASSEMBLY

● Precautions on handling the mechanism module (Fig.1)

1. Hold the upper and main frames.
2. Do not hold the front portion of the upper frame. It is a delicate part.
3. Do not touch the switches on the top panel.
4. Be careful not to catch the flexible cables.

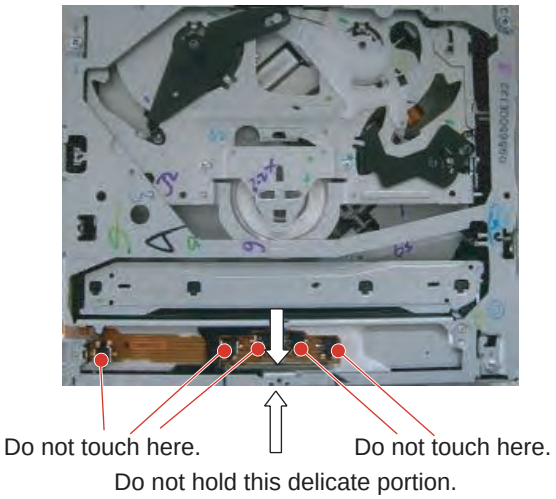


Fig. 1

● Removing the module pc board (Fig.2 and 3)

1. Set the mechanism to the lock position (disc load standby position).
2. Place the mechanism module upside down.
3. Short the two lands on the pickup flexible cable as shown below.
4. Be sure to disconnect the pickup flexible cable and the SPDL flexible cable from the connectors to protect them from damages.
5. Remove solder from the load motor leads and clamp SW leads.
6. Loosen the two fixing screws. Lift the position A of the module pc board lightly and move it in the direction B to remove it. Be careful not to damage the flexible cable C.
7. Disconnect the 8/12 detection flexible-cable from the connector.

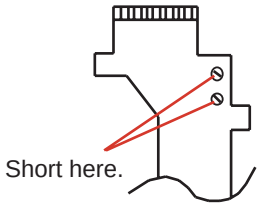


Fig. 2

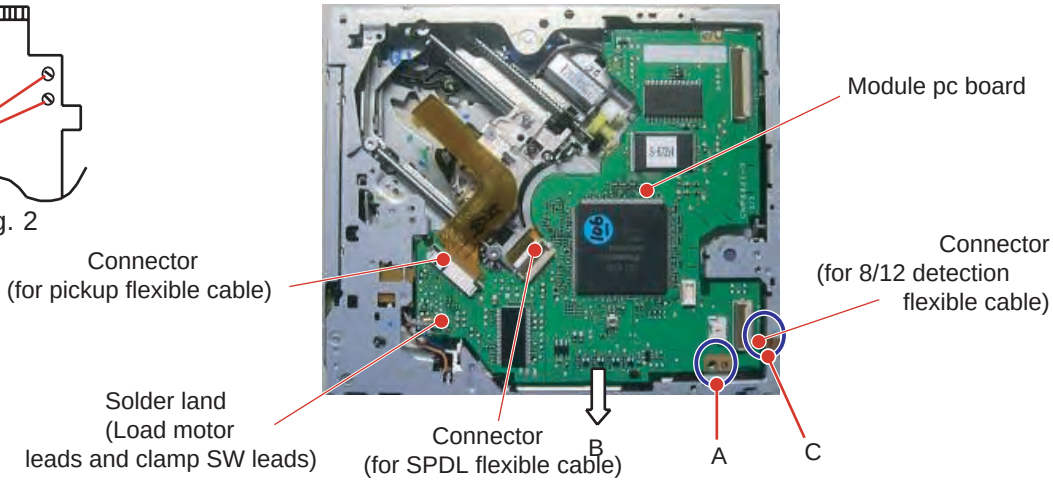


Fig. 3

● Removing the pickup unit (Fig. 4)

1. Remove the module pc board in accordance with the procedure of "Removing the module pc board."
2. A principal-axis control spring is hung on a CRG chassis.
3. While holding the pickup case, remove the skew screw (main).
4. Lifting the end of the pickup rack, slide the main shaft, and remove the pickup unit.

Notes:

Replacing the pickup unit requires the skew adjustment .

Remove glue from both ends of the main and sub shafts, and skew stud.

Do not reuse the old skew screw . Be sure to use a brand-new skew screw supplied with a new pickup unit.

Fix the locking agents(1401M : produced by THREE BOND) after adjustment

Hang on a position based on a principal-axis control spring.

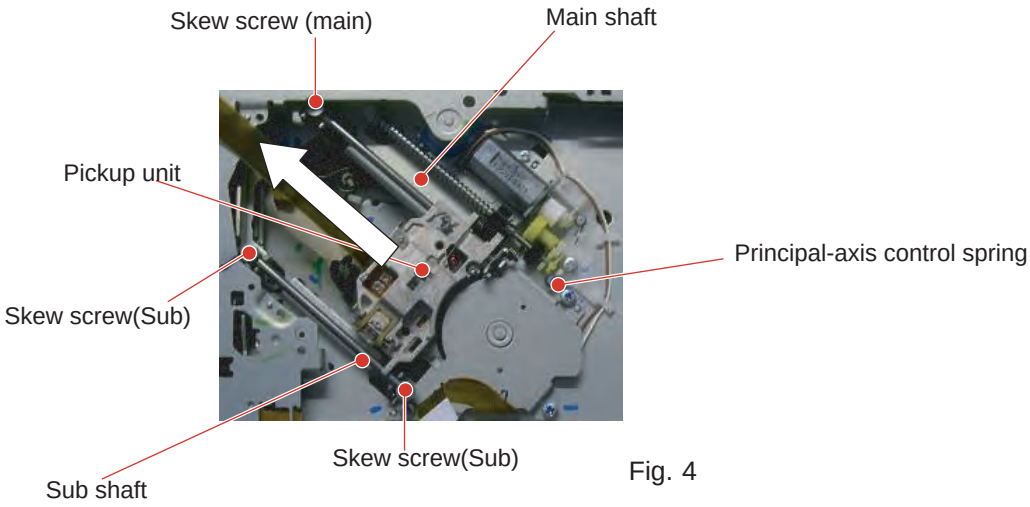
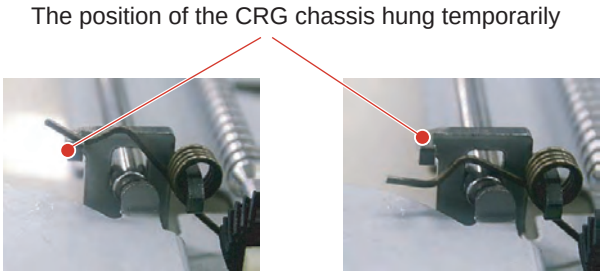


Fig. 4



● Removing the spindle motor (Fig.5)

1. Remove the module pc board in accordance with the procedure of "Removing the module pc board."
2. Remove the three fixing screws for the SPDL motor. Be careful not to deform the CRG chassis when replacing the SPDL motor.
3. After removing the lead of a CRG motor from a hook, it removes from a flexible land.

● Removing the CRG motor assy (Fig.5)

1. Remove the module pc board in accordance with the procedure of "Removing the module pc board."
2. Remove the module pc board in accordance with the procedure of "Removing the spindle motor."
3. Remove the feed screw.
4. Remove the fixing screw , and remove the feed screw holder together with the 2-stage gear .
5. Remove the fixing two screws and CRG motor assy .

Caution:
When replacing the CRG motor assy , be careful not to damage the gears, especially the 2-stage gear that is very delicate. When lifting the pickup rack to install the motor , be careful not to damage the gear teeth.
When you remove a feed screw, be careful for a feed screw holder not to separate.

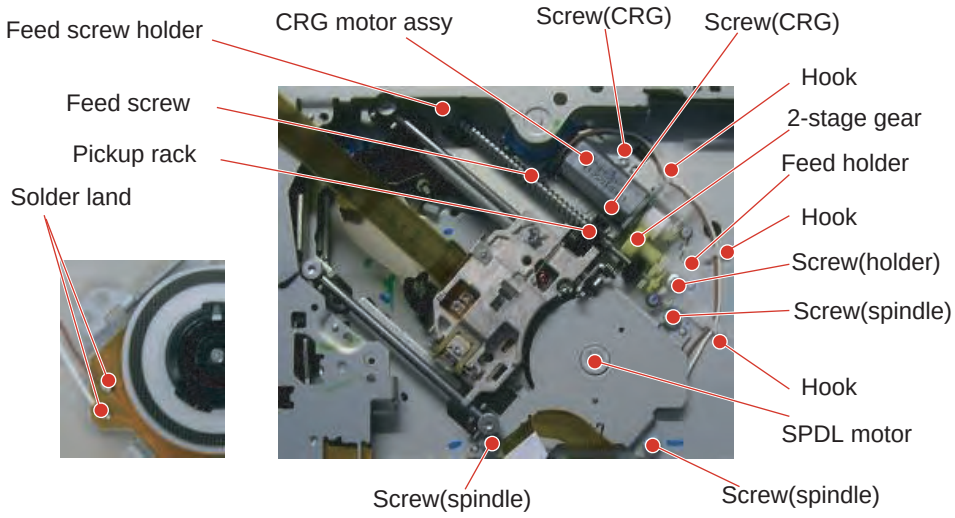


Fig. 5

● Removing the upper frame assy (Fig. 6)

1. Remove the module pc board in accordance with the procedure of "Removing the module pc board. "
2. Remove the spring.
3. Remove the four screws and remove the upper frame assy .

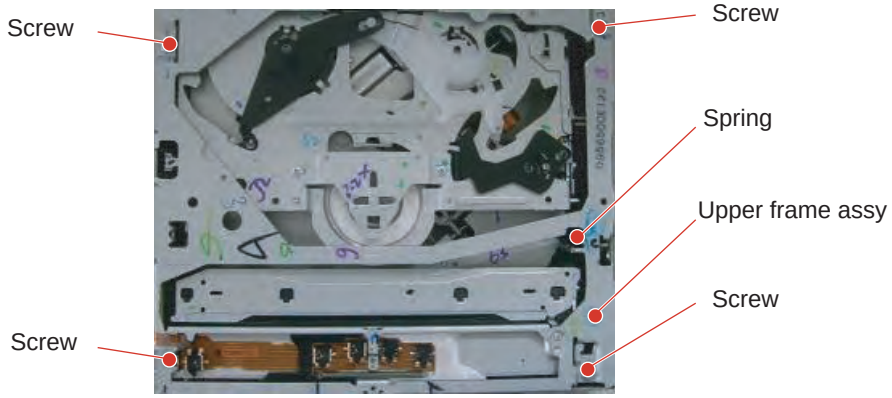


Fig. 6

● Removing the load gear assy (Fig. 7)

1. Remove the module pc board in accordance with the procedure of "Removing the module pc board."
2. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy."
3. Remove the two screws and remove the load gear assy .

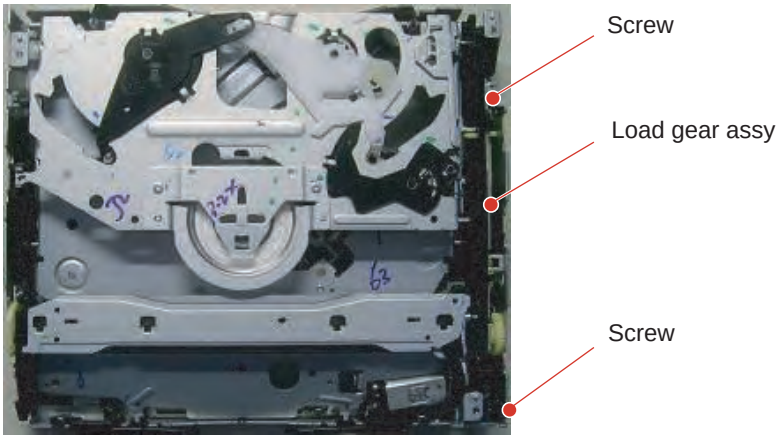


Fig. 7

● Setting the quasi-clamp mode by driving the loading motor (Fig. 8)

1. While driving the loading motor in the clamping direction, pull the clamp lever toward the front side.
2. Even after the clamp lever pushes the loading rack (clamp mode), keep the clamp lever pulled lightly. Prevent the clamp lever bar ring from coming into the clamp spring. If not, ejection will not be impossible.
3. After the clamp operation ends, stop the operation before the objection of the loading rack touches the load lever R. (fig. 10)

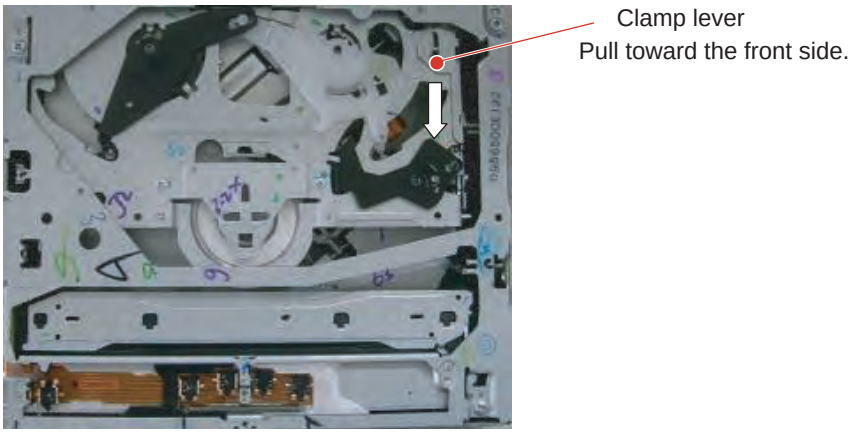
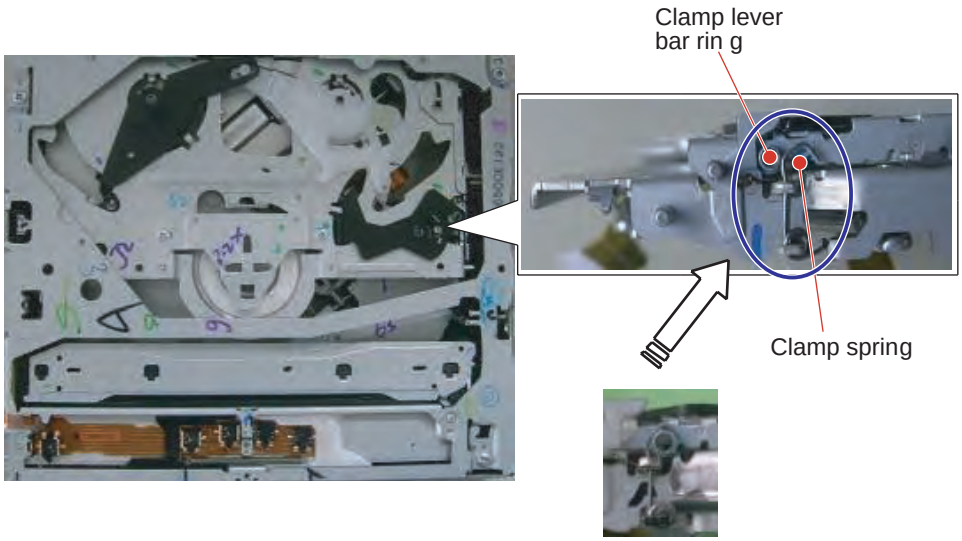


Fig. 8



Prevent the clamp lever bar rin g from coming into the clamp spring (the above condition is NG) Fig. 9

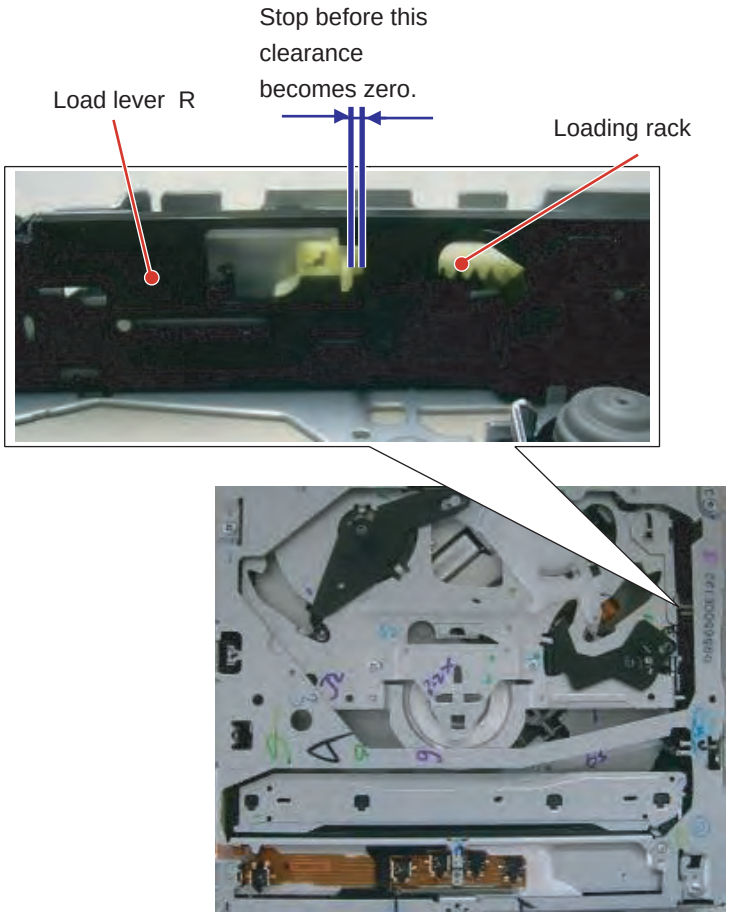


Fig. 10

● Setting the quasi-clamp mode manually (Fig. 11)

1. Remove the module pc board in accordance with the procedure of "Removing the module printed circuit board."
2. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy ."
3. Remove the load gear assy in accordance with the procedure of "Removing the load gear assy ."
4. While pulling the clamp lever toward the front side, pull the fixed portion of the load lever R toward the front side until the mode enters the clamp position.

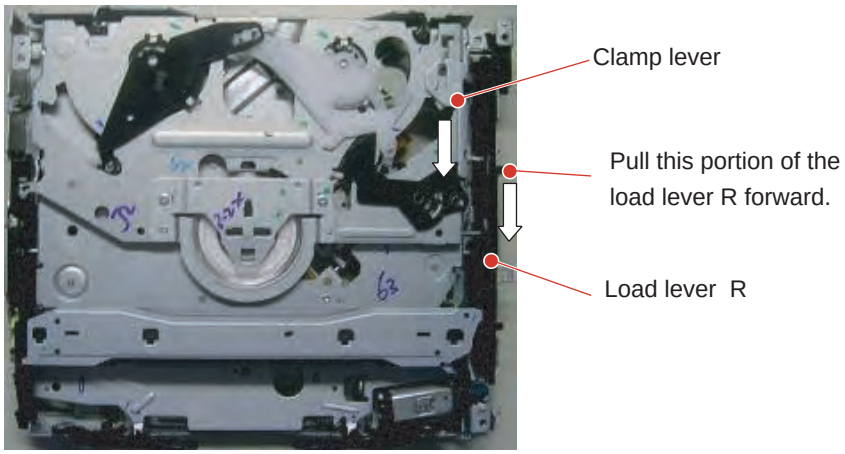


Fig. 11

● Removing the load motor assy (Fig. 12)

1. Remove the module pc board in accordance with the procedure of "Removing the module printed circuit board. "
2. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy ."
3. Remove the load gear assy in accordance with the procedure of "Removing the load gear assy ."
4. Enter the quasi-clamp mode in accordance with the procedure of "Setting the quasi-clamp mode manually ."
5. Remove the screw . Slide the load motor assy to pull it out .

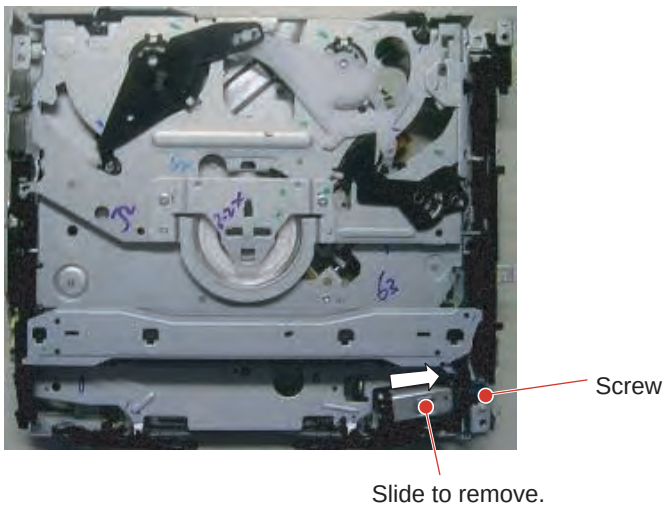


Fig. 12

● Removing the CRG assy (Fig. 13)

1. Enter the quasi-clamp mode in accordance with the procedure of “Setting the quasi-clamp mode by driving the loading motor .”
2. Remove the module pc board in accordance with the procedure of "Removing the module pc board. ”
3. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy .”
4. Remove the four springs.
5. Lift the CRG assy until the shafts come from the dampers, and then remove it.

● Removing the disc guide assy (Fig. 13)

1. Enter the quasi-clamp mode in accordance with the procedure of “Setting the quasi-clamp mode by driving the loading motor .”
2. Remove the module pc board in accordance with the procedure of "Removing the module pc board. ”
3. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy .”
4. Remove the two disc guide springs. While lifting the disc guide and keeping the lifting angle around 45 degrees, slide the guide in the left side to remove it.

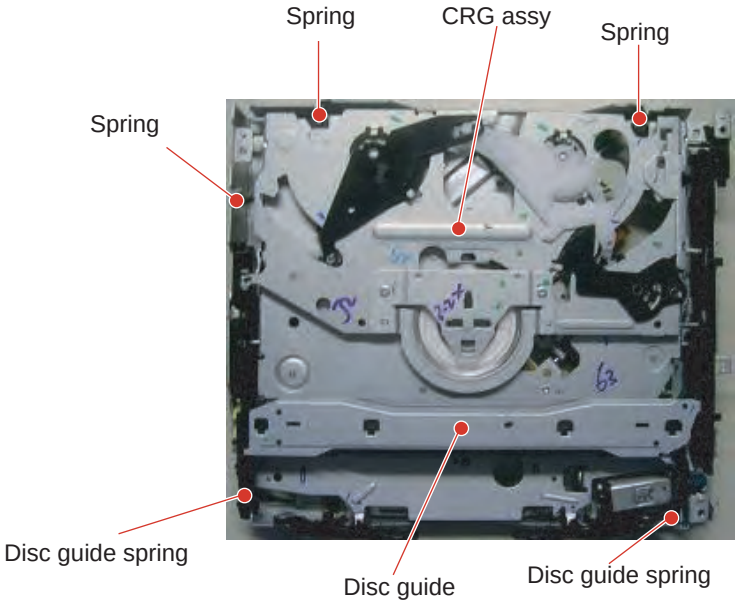


Fig. 13

● Removing the roller assy (Fig. 14)

1. Remove the module pc board in accordance with the procedure of "Removing the module pc board."
2. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy."
3. Remove the tension spring.
4. Remove the load gear assy in accordance with the procedure of "Removing the load gear assy."
5. Enter the quasi-clamp mode in accordance with the procedure of "Setting the quasi-clamp mode manually."
6. Remove the disc guide assy in accordance with the procedure of "Removing the disc guide assy."
7. Remove the CRG assy in accordance with the steps 4 and 5 in the procedure of "Removing the CRG assy."
8. By pushing the fixed portion of the load lever R, move the load lever R to the rear side completely.
9. Remove the load levers R and L. Unhook the end of the roller arm spring R from the load lever R.
10. While lifting the roller assy to the highest position, slide it to the right side. Lightly bend the whole slot guide by pushing the ends with your fingers and remove the roller assy .

Caution : A shutter is not changed when removing Roller Assy.

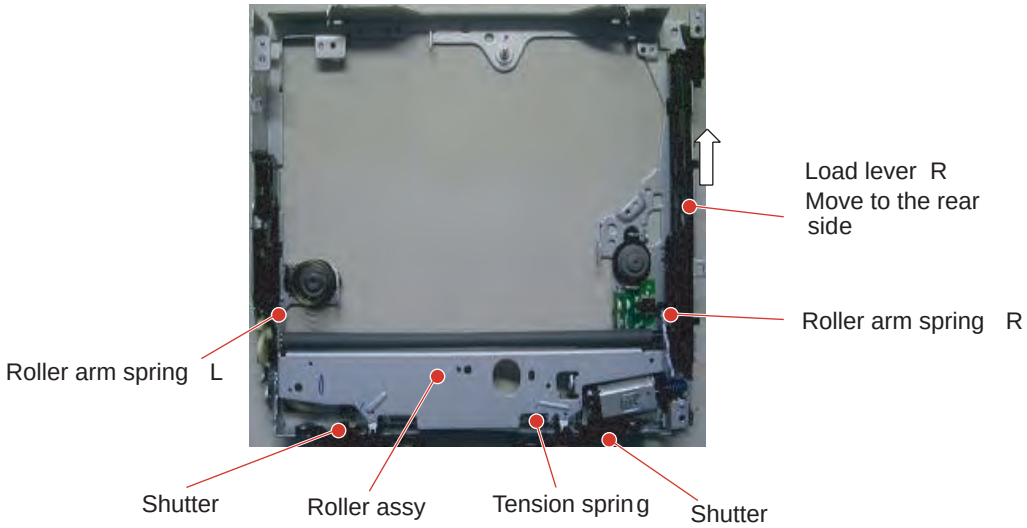


Fig. 14

● Removing the dampers (Fig. 15)

1. Enter the quasi-clamp mode in accordance with the procedure of “Setting the quasi-clamp mode by driving the loading motor .”
2. Remove the module pc board in accordance with the procedure of "Removing the module pc board. ”
3. Remove the upper frame assy in accordance with the procedure of "Removing the upper frame assy .”
4. Remove the three springs.
5. Remove the CRG assy in accordance with the steps 4 and 5 in the procedure of "Removing the CRG assy.”
6. Release each of the three dampers from the clinches as follows:
   - 6.1 By using a pair of pliers, hold the portion A and turn them in the direction B. While making a gap in the portion C, release the damper from the clinches.
   - 6.2 Insert a flat-type screwdriver into the portion D. Slightly raise the plate and release the damper from the clinches.
7. Remove the CRG motor assy in accordance with the steps 3 through 5 in the procedure of "Removing the CRG motor assy .”
8. Remove the dampers.

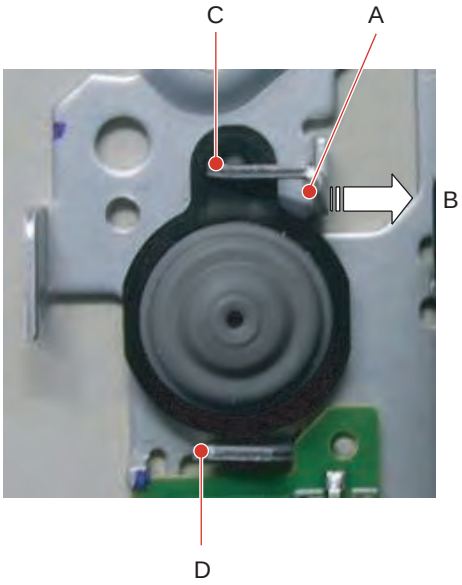


Fig. 15